ASHESI UNIVERSITY COLLEGE

A MOBILE APPLICATION UTILIZING GEOLOCATION TECHNOLOGY TO ENHANCE TICKET SALES IN GHANA

Applied Project

B.Sc. Management Information Systems

Francis Kornu

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A Mobile Application Utilizing Geolocation Technology to Enhance Ticket Sales in Ghana

Applied Project

Applied Project submitted to the Department of Computer Science, Ashesi University College in partial fulfilment of the requirements for the award of Bachelor of Science degree in Management Information Systems

Francis Kornu

April 2017

DECLARATION

I hereby declare that this applied project is the result of my own original work and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature:

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Candidate's Name:

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Date:

……

I hereby declare that preparation and presentation of this applied project were supervised in accordance with the guidelines on supervision of applied project laid down by Ashesi University College.

Supervisor's Signature:

……

Supervisor's Name:

……

Date:

……

Acknowledgement

I would like to thank God for the good health and wellbeing that were necessary to complete this project. I wish to express my sincere gratitude to my supervisor, Stephane Nwolley for his constant supervision and guidance. I also wish to thank all my family members and friends for their support and help during the challenging times.

Abstract

According to a 2013 report by the international youth foundation, Ghana has seen some increased development in the fields of software, communication and technology. Aside this, the number of individuals having access to high end phones has also seen an increase. Even with all this technology people still find it difficult to access tickets for events that are organized in the country. The ticketing industry in Ghana is still patronizing the traditional system of issuing tickets which obviously has many flaws. This system involves printing out paper tickets which are later moved to vantage points across the country for people to access. The cost involved in this process is not the only problem. The existing problems are that, tickets vendors sometimes use the concept of protocol to sell tickets. That is, they tend to reserve tickets for potential customers who may or may not show up. This action leads to losses in most cases. Queuing and moving long distances for tickets also tends to discourage several people from buying tickets. This paper proposes an improved way to solve the problems faced by many who seek to acquire tickets for events. The ePublisher is mobile application that makes use of Global Positioning Services (GPS) and QR code development to make the process of accessing tickets easier and faster.

The application was to be designed to change the experience people have when they are buying tickets for events. Thus, the eight golden rules of interface design coupled with rapid prototyping, the application interface was generated. The GPS feature of the application allows users to locate vendors of tickets around them. Markers displayed on the map symbolizes a vendor and this helps people move to the nearest vendor. In addition, users get to see the number of tickets available and this would guide their decision making.

In effect, the implementation of the ePublisher would help reduce the unproductive movement of people to vendors without getting tickets to buy. Queuing and loss of revenue due to the use of protocol would also be checked. Finally, people interested in attending

events would be able to buy tickets by a click of a button and all this is done in the comfort of their homes.

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Chapter 1: Introduction

1.1 Background

Ghana has witnessed sharp increase in the development of software, enhancement of our communication and technology industry (International Youth Foundation, 2013). Coupled with this development is the increased number of people who have access to mobile phones and adequate channels to make proper use of them. This has given the chance for mobile banking to survive and is giving chance for other service to make use of the mobile and communication industry to enhance their services. Mobile phones being produced currently are programmable and come with a set of cheap, powerful and embedded sensors such as gyroscope, GPS, accelerometer and cameras. (Lane, Miluzzo, Hong, Peebles, Choudhury & Campbell, 2010). "As telecommunication markets mature, mobile phones in Africa are evolving from simple communication tools into service delivery platforms. This has shifted the development paradigm surrounding mobile phones from one that simply reduces communication and coordination costs to one that could transform lives through innovative applications and services" (Aker & Mbiti, 2010). Jenny Aker and Isaac Mbiti's research reaffirms the point about the adoption of mobile phones in the region. These scholars also note that mobile phone coverage in Africa has grown at an astounding rate over the last ten (10) years. In the year 2008, it was estimated that 60 percent of the population primarily in Northern Africa and South Africa would get a signal and an area of 11.2 million square kilometres and would have mobile phone coverage (Aker & Mbiti, 2010). This statistic just validates the choice of using mobile applications to help enhance the services provided in our various cities and country, specifically Ghana for that matter.

Even with the increased number of mobile devices in Ghana, it is relatively easier to trade and keep in touch with people, but trading is still to be affected positively. In this part of the world, Africa, where proper direction systems have not been put in place, location of

prospective sellers becomes very difficult. Where the location of vendors is even known, one would have to join long queues to have access to the desired ticket. Through research and observation on the advantages of having your services available online, it was noticed that, people who tend to buy online place lots of value on their time thus they prefer buying online to avoid the issues of queuing (Karayanni, 2003). In most cases, the said vendor may run out of tickets or an item that customers desire. Without this knowledge, people troop to the expected destination just to be disappointed. This paper proposes a mobile application that would use the geolocation technology embedded in mobile devices alongside the option of online purchasing to aid in obtaining items of interest, mainly tickets for events in Ghana.

1.2 Manual and Traditional Ticketing System in Ghana

The manual approach to ticket production and dispersion has been the way transactions have been conducted whenever there is there is an event that requires attendees to have tickets. This is seen every time there is a football match or music concert going on in the country (Ghana). Tickets are pre-printed with bar codes or QR codes on them. These tickets are then sold at vantage points across cities. Once these tickets are bought, individuals who show them at the entrance of event centres can enter. This practice brings about various problems with respect to tracking of tickets that have already been used to prevent two people from using one ticket to gain entry. To add to that, tracking the sales of these tickets is not an easy task, as such revenue generated in most cases does not amount to much.

Long queues become a common occurrence at the designated places where customers are to obtain tickets. The prospects of queuing discourage many from attempting to purchase tickets to events they would like to attend. Tickets cannot be easily tracked as such, it gives chance to many people looking to make money through inappropriate channels generate their own tickets and sell at lower prices.

1.3 Modern Approach to ticket selling

Over time, more people have made adequate use of technology to enhance services they provide. The introduction of the internet and easy access to computers can be considered a blessing. It is without doubt that, the internet has become the most prominent tool in today's business environment creating a flatter and more connectivity (Quarhsie & Ami-Narh, 2012). The use of RFID (Radio Frequency Identification) devices have also picked up from the introduction of more advanced technology. The use of RFID tags on bus systems have seen increased acceptance from the public who use cards fitted with RFID tags to be scanned by a reader on a bus. This reader tends to pick up information about the user and charge accordingly (Mahedi, Golam, Kafiul, Rezwanul, & Alam, 2010). Roverman Production has successfully utilized the internet to achieve competitive advantage over other rivals in the market. They have introduced a ticketing system which has been designed to simplify the process of acquiring tickets to the company's plays. Roverman Production has provided electronic rechargeable tickets that will give users the convenience of reloading used tickets to watch the plays (Daabu, 2013). The unforeseeable challenge here would certainly be the instance where there is no internet to access the necessary websites. The possibility of losing the physical ticket also possess a likely threat to this channel created to make ticket accessibility easier.

Many other event planners post directions to venues online where customers could have access to the tickets needed. Most of these directions are in text format which presents yet another challenge since individuals may find difficulties locating places. This means of broadcasting is relatively equal to not telling them where to find these locations.

1.4 Innovation

This paper, as stated earlier, seeks to introduce a new way to enhance the way people purchase event tickets. The proposed application would run on the mobile platform

preferably android and Windows as a start. The introduction of Global Positioning System (GPS) to mobile phones of this era would allow the application to make use of geolocation technology. Vetted and certified vendors selected by event organizers would have their locations put up on a mobile application. Interested customers with the application would be able to find the nearest vendor to them using the geolocation feature. The number of available tickets and various seats are also made known to the customer which would help inform his or her decision. Another feature that would be implemented would be to allow customers make payment via various payment modules such as mobile money, PayPal.

An added feature of the application would be to allow administrators and event organizers send short messages to individuals based on specific events that are being hosted. The system would also introduce the concept of e-ticketing where the ticket would be represented by a generated bar code or QR codes. This approach would allow for close monitoring since each bar code or QR code generated is logged and accounted for. These codes are scanned at the entrance of event venues to gain entrance.

Chapter 2: Related Work

2.1 Existing Applications

This chapter describes the various programs and implementations that have been developed to cater for the issues pertaining to ticket distribution and sales. Aside the description and discussion of various software developed, there is an outline of how the user requirements are to be obtained.

Gudymenko, Sousa and Kopsell noted how e-ticketing systems for public transportation have become an integral part of the intelligent systems which shape the urban environment of the future (Gudymenko, Sousa, & Köpsell, 2014). The consumer of this proposed system is required to first obtain the e-ticket online. This approach could be ineffective when internet connectivity is inaccessible during the time a user wishes to utilize the system. The second step is for the user to make the e-ticket available for stamping by being in a specific range of the stamping machine. Thus, being outside this range would mean that, the e-ticket purchased would not be stamped and cannot be used. The way this problem was fixed was for the stamping machine to be placed at vantage points in all transit stations to make it easy for tickets to be validated. The final step is termed as e-ticketing validation. In this instance, a conductor checks the ticket to find out if the ticket is valid and has been stamped correctly. This validation activity is carried out using a handheld device.

Another application that makes use of the mobile platform is the introduction of the Advance Movie Ticketing System. This system was designed for online booking of movie tickets. Upon booking a ticket, a secured QR code is created which is later used as the ticket verification and authenticity at various cinema halls. Initially, individuals would have to check for movie timings and wait in queues to purchase tickets from ticket vendors sitting in booths at the cinema halls. The introduction of the ordering system reduces the issues

related to queuing and human interaction. This innovation is a great step in a direction of technological advancement but the problem of the inability to utilize the system could arise. People without the technological training or knowledge of how the system worked could not use the system with the ease and efficiency needed thus the purpose of the system is lost (Shaik, Kishor , Sai , & Anisha , 2014).

To solve the issues presented by using paper tickets and magnetic cards, smart cards and e-ticketing systems were implemented for public use. The implementation of e-ticketing was initialized by the TELEPAY project (Gražvydas, 2006). The system was to allow the purchase and payment for virtual e-ticket through mobile phones, using SMS, WAP and short range communication technologies. The initial stage to obtain a ticket required that a potential user access information about the desired ticket. This is done either through Wireless Application Protocol (WAP) or Short Message Service (SMS). After the desired ticket is found, a registration process is carried out and this needed for further inspection of the ticket later. Purchase of the ticket is then carried out, after which an e-ticket is delivered via any of the two protocols stated above (Gražvydas, 2006).

The authenticity aspect of all the systems in use helps in controlling the issue of illegal sales of tickets to customers which results in low revenue generation.

The application being proposed in this paper would make use of the concept of barcode and QR code to enhance security, thus making it impossible to use one ticket to access the auditorium more than once. The application would also include a geolocation system to aid customers to locate vendors of the tickets based on the coordinates provided by event organizers. To make the system more efficient and user friendly, the application would implement the concept of human computer interaction to come out with the best combination of features to use.

2.2 Plan for Requirement and User Interface

The likely end users of this application would be people who are interested in attending events that are hosted in the country as well as the organizers of these events. To obtain the necessary requirement of the system, it would be essential to review and observe the existing applications that perform similar functionalities as the proposed application in this paper. The focus area would be on how efficient the existing applications are in relation to usability and simplicity. This is because, the system is to be designed to make it usable by everyone in the target group. Aside, the requirement for the application, there is the need to understand the various reasons behind the user interfaces used by all existing applications. Using the eight golden rules of interface design coupled with rapid prototyping, the application interface would be generated. The feedback and results generated from the research would then be combined to provide a well-defined user requirement for the application.

Chapter 3: System, Database Architecture and Design

3.1 MVC Architecture

The MVC (Model-View-Controller) architecture is a way of breaking an application into three fragments: the model, the view and the controller. This approach applies in the graphical user interaction model of input, processing and output.

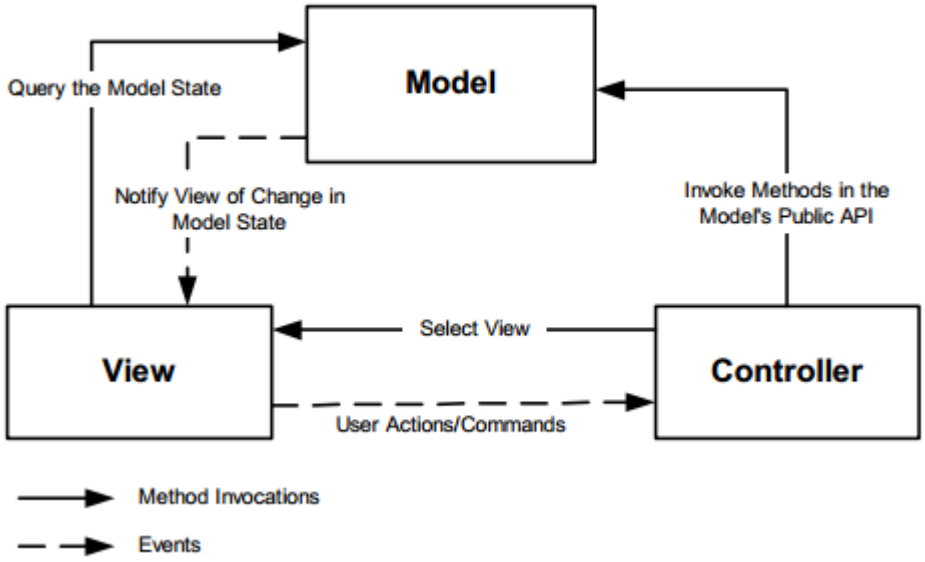

Figure 3.1 showing MVC Architecture. Adapted from Gulzar, Ganeshan (2002).

The Model component contains the functional core of the application. It captures the suitable data, and exports procedures that perform application-specific processing. In addition, the model groups related data and operations for providing a specific service. The Controllers call these procedures on behalf of the user. The controller is responsible for intercepting and translating user input into actions to be performed by the model. The controller is also responsible for selecting the next view based on user input and the outcome of model operations. The View is responsible for rendering the state of the Model. The View can be manipulated to suit different users and the View also forwards user inputs to the controller (Gulzar & Ganeshan, 2002).

3.2 User Interface

Chapter 2 highlighted the method by which the user requirement and user interface would be generated. Following the steps indicated as the eight golden rules which states that, there is the need to strive for consistency, seek universal usability, offer informative feedback, design dialog to yield closure, prevent errors, permit easy reversal of actions, keep users in control and reduce short term memory load. Based on the information obtained, initial prototypes were developed using online resources such as Flowchart Maker**. Figure 3.2** and **3.3** are snapshots of the user and administrators home page respectively. The pages below show the use of well-known icons and descriptions of buttons to indicate the possible functionality available to the user.

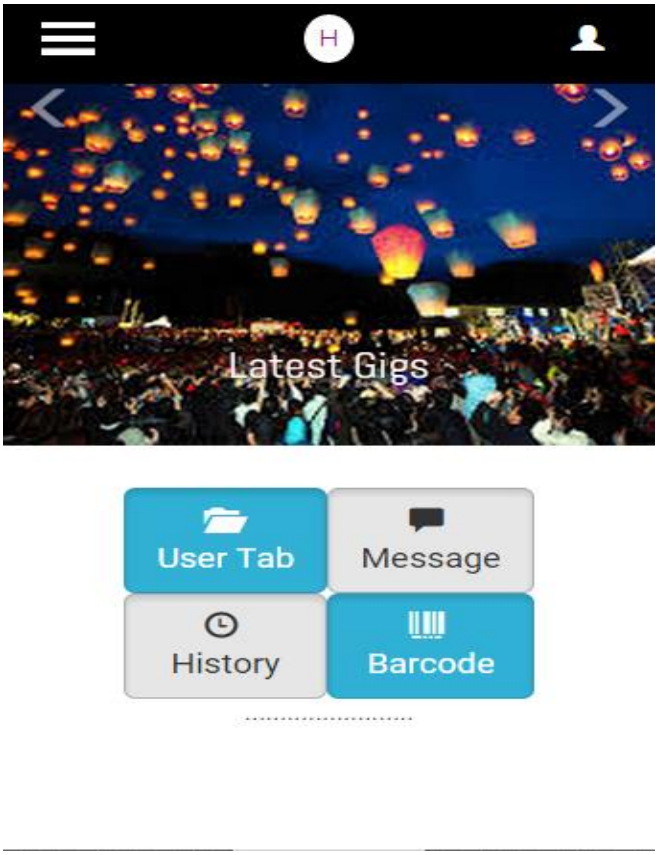

Figure 3.2 Showing Home page for User

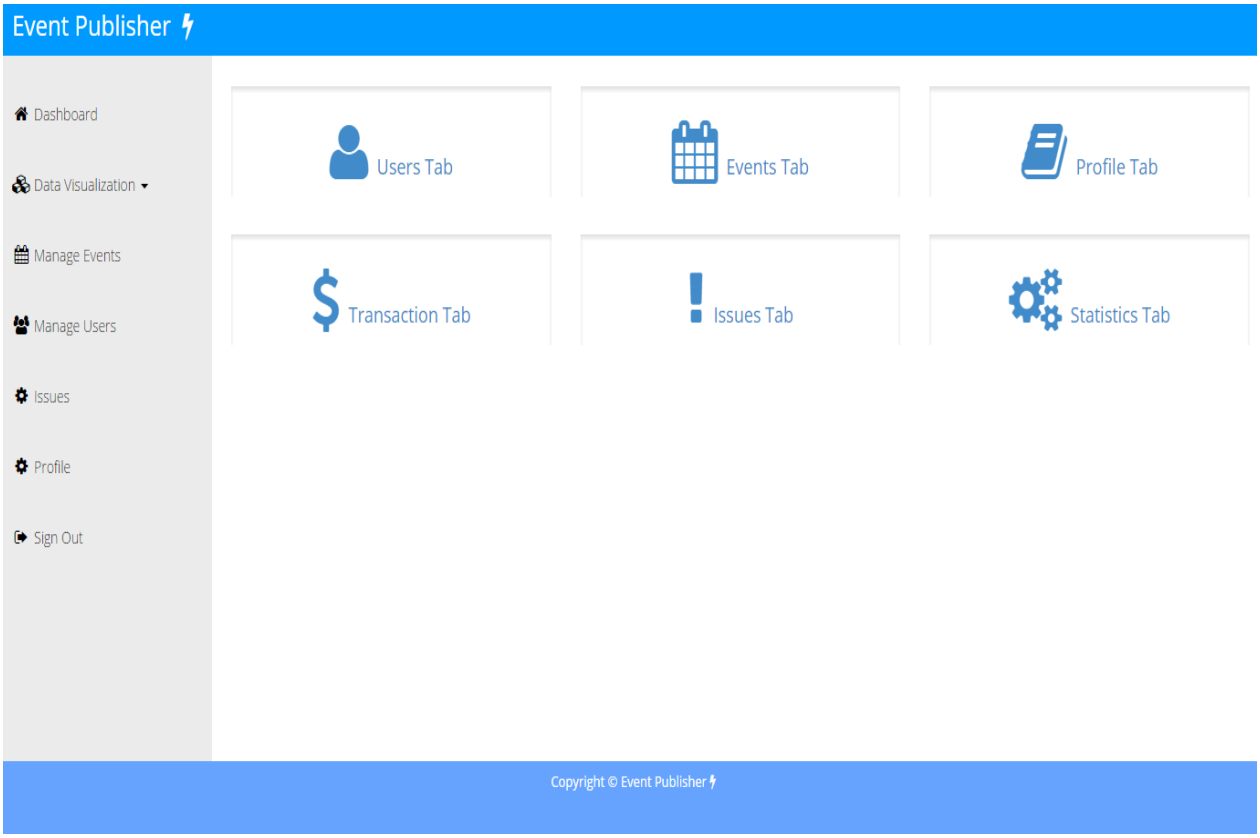

Figure 3.3 Showing Dashboard for Admin

3.3 User Requirements

The intended mobile application is required to meet the following requirements:

- The application should be simple and easy to manipulate. Users should be able to manage their ticketing accounts.
- Information sharing should be something the mobile application can handle effectively. Information should be easily shared amongst individuals who have the application.
- The application should be able to provide real time updates in relation to event news and information.
- The application should allow users to buy tickets both online and be able to use locations of event ticket vendors to have access to tickets.

3.4 Functional Requirements

- The user should be able to login or sign up: This is a feature that would allow new and already existing individuals have access to the mobile application. This would require a username and a password for existing users. For new users, they would be required to fill out a more detailed form stating basic information to aid in identification.
- The user should be able to find information about upcoming events: This feature would allow user have access to information about the events which would help guide their decision when the time comes to buy a ticket.
- The user should be able to purchase tickets remotely: The users of the application should be able to pay via mobile money or SlydePay and have access to an e-ticket that would be used to gain access to the event. This feature would require some additional information to generate the e-ticket.
- The user should be able to use the geolocation feature to locate ticket vendors around them: If a user is not able to obtain tickets online, they could easily locate a vendor close to them where they could buy tickets.
- The user should be able to identify the number of tickets left for sale online and all other sales outlets.
- The admin of the system should be able to send out details about events to specific individuals: Using information stated by the users, the admin can target specific users of the application.
- The user should be able to change his or her profile: At some point in time people's interest may change. As such, the application would give these people the chance to make changes to their user account details.

3.5 Non-functional Requirements

- The system should be able to restrict unauthorized entry onto the application platform.
- The system should be able to function across platform. (IOS, Windows, Android)
- The application should provide accurate and correct information

3.6 Use Case Diagrams

Outlined in this section are some high-level description of what functions would be carried out in the user and administration application. It is expected that, general users would be able to launch the application, after which they would be able to find events of their choosing, purchase online, read necessary messages and access barcodes which represent the tickets. Figure 3.4 shows the activities that a user can perform while Figure 3.5 shows activities an admin can perform.

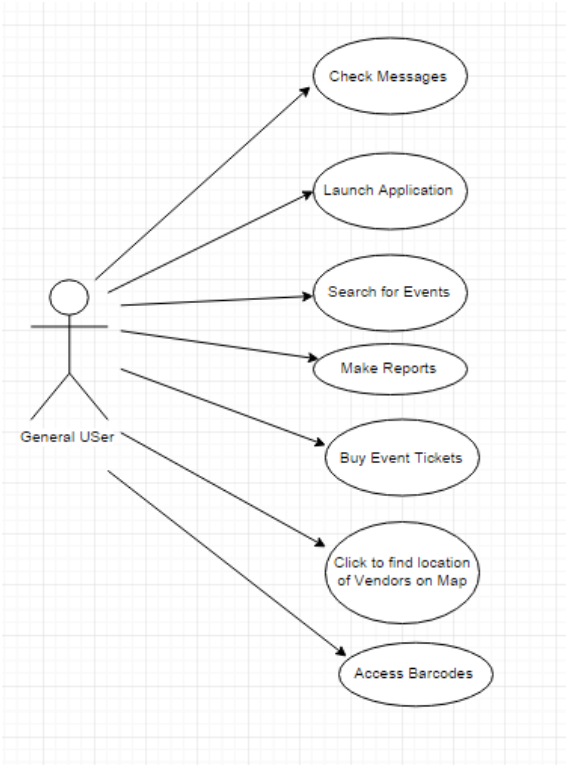

Figure 3.4 Diagram to show activities users can perform

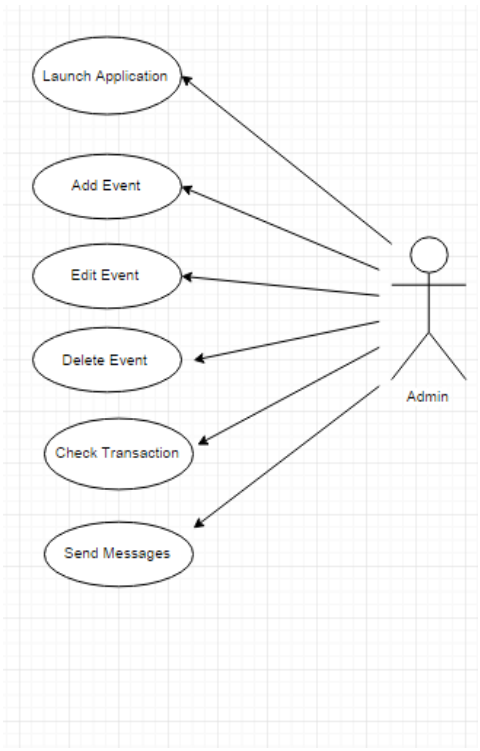

Figure 3.5 Diagram to show activities administrators can perform

Chapter 4: Implementation

4.1 Technology and Tools Used

4.1.1 Xampp /MySQL

Xampp is an open source cross-platform web server solution stack package developed by Apache, consisting mainly of the Apache HTTP Server, MySQL database, and interpreters for scripts written in the PHP and Perl programming languages. This would help run prototypes of the application built. Also, it provides a database system that would be essential to the development of the application. The coordinates for the map implementation would be stored in this database to be utilized by the application when the user requires it. Figure 3.4 shows the database design with all the various relationships. Figure 3.4 shows the necessary tables and their relationships (Lyit.ie, 2017).

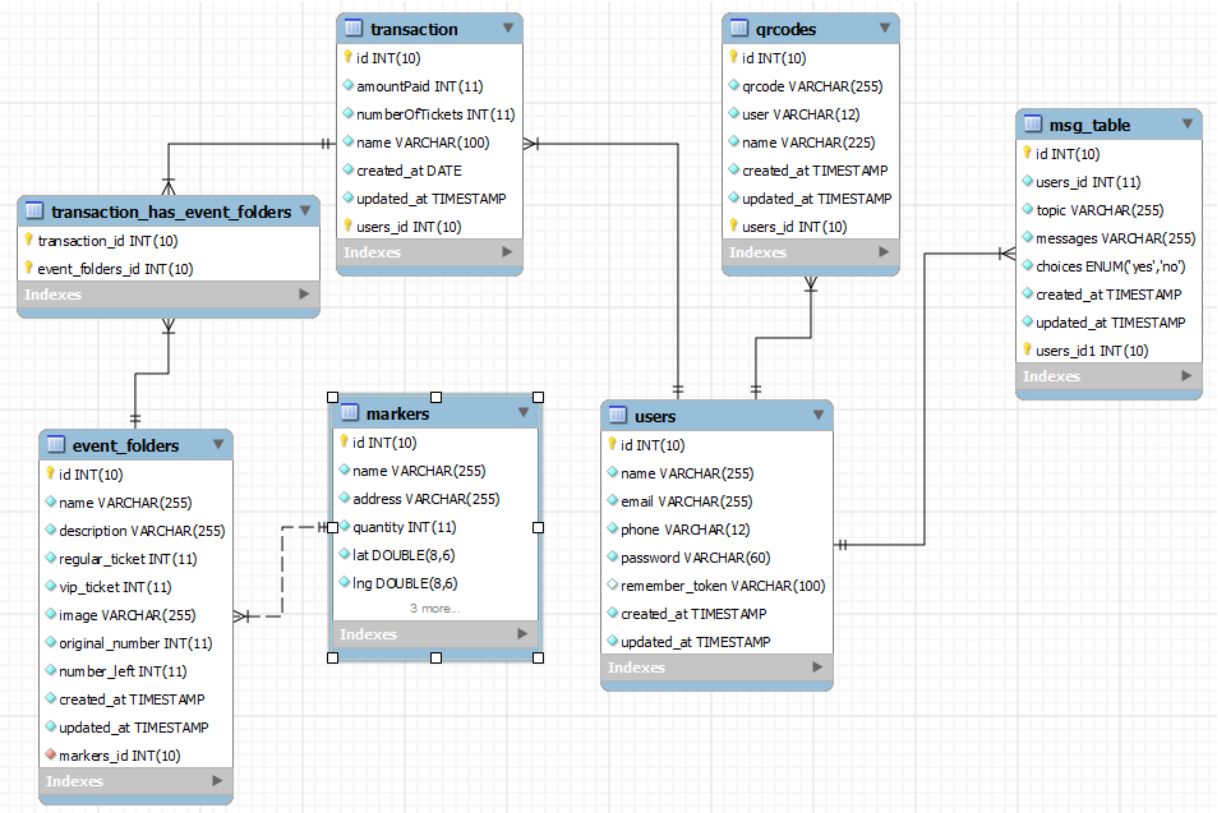

Figure 4.1: shows the database design

4.1.2 Sublime Text

Sublime is a proprietary cross-platform source code editor with a Python application programming interface (API). It natively supports many programming languages and mark-up languages. All coding would be done using Sublime.

4.1.3 Google Place APIs

This is a web service that returns information about places. Defined within this API are establishments, geographic locations, or prominent points of interest using HTTP requests. This would help in the implementation of the feature that would assist users of the application to find vendors using the map. Figure 4.2 shows a snippet of how the API is utilized to deliver the expected outcome. The locations are obtained from longitudes and latitude columns in the application database.

```
var locations = <?php print_r(json_encode($locations)) ?>;

var mymap = new GMaps({
  el: '#mymap',
  lat: 21.170240,
  lng: 72.831061,
  zoom:8
});

GMaps.geolocate({
  success: function(position) {
mymap.setCenter(position.coords.latitude, position.coords.longitude);


$.each( locations, function( index, value ){
  mymap.addMarker({
    lat: value.lat,
    lng: value.lng,
    title: value.name,
    click: function(e) {
      alert('This is '+value.name+', a vendor of event tickets\n'+'Address: '+value.address+'\n'+
        'The number of tickets left: '+ value.quantity);
    }
  });
});
}
});
```

Figure 4.2: shows the implementation of the google places API

4.1.4 Google Charts APIs

Google charts are powerful tools that aid in providing a perfect way to visualize data on websites. The common way to make use of this service is to use JavaScript that is embedded in the PHP code. Google libraries are then loaded to aid in the development of the needed charts. Figure 4.3 shows the implementation of the google charts that would aid the administrators of the system have a much better understanding of the figures they work with.

```
var data = new google.visualization.DataTable();
data.addColumn('string', 'Name Of Event');
data.addColumn('number', 'Number Of Tickets');
@foreach($events as $post)
  data.addRows([
  ['{{$post->name}}', {{$post->numberTickets}}]
]);
@endforeach

// Set options for Tickets pie chart.
var options = {title:'Total Event Ticket Purchased',
               width:500,
               height:300,
               is3D: true};

// Instantiate and draw the chart for Ticket Purchased.
var chart = new google.visualization.PieChart(document.getElementById('piechart_div'));
chart.draw(data, options);

var barchart_options = {title:'Barchart: Total Event Tickets Purchased',
               width:480,
               height:300,
               legend: 'none'};
var barchart = new google.visualization.BarChart(document.getElementById('barchart_div'));
barchart.draw(data, barchart_options);


}
```

Figure 4.3: shows implementation of google charts

4.1.5 Online Payment Platforms

This is an e-commerce application platform to enable users pay for tickets remotely using credit card or payment systems like PayPal or SlydePay.

4.2 Programming Language and Frameworks

4.2.1 HTML/JavaScript/Ajax

In building a mobile application, the main language used in the development is HTML, JavaScript and possibly Ajax. The application is meant to be a cross platform to make it accessible to a larger number of users. JavaScript is another language to be used to complement the use of HTML. The code is to be run through PhoneGap thus the need for extensive HTML and JavaScript programming. The ajax section of the code would allow for information to be passed between pages without changing the pages.

4.2.2 PHP

This is another essential programming language that would enable the application to communicate to the database. JavaScript and Ajax would be used to communicate with the PHP pages and codes of the application.

4.2.3 CSS/Bootstrap

The CSS component is enable the design of the application to enhance its usability. Bootstrap is a UI component library created with CSS that could incorporated into the application's system design. Aside the use of bootstrap, to make the application would user friendly and usable, a CSS template was included in the design process to aid in the development of the mobile and administrative application.

4.2.4 Laravel Framework

Laravel is a web application framework with expressive and elegant syntax. In order to make use of the Laravel framework, there is the need to have the PHP composer component installed as a start. The composer can either be installed using the command line and alternatively installed by downloading the package from an online resource. The next

step is to initiate a process to start-up a new project which would utilize the laravel framework

Chapter 5: Testing and Results

5.1 Testing Plan and Strategy

The purpose of this chapter is to illustrate a series of testing procedures that were carried out on the applications developed. The focus area would be that of the application meeting its functional and non-functional requirements. The test was carried out repeatedly whiles test scripts and code is verified and all bugs identified and fixed. After bugs and defects are fixed, the application is tested again to make sure functions and object classes are functioning at optimum capacity.

5.2 Development Testing

Components making up the system are constantly being tested while the development of the system is still in progress. Components may be simple functions or object classes and many of these are independent of one another. Some of the components may also rely on others to be able to perform their own function. Thus, it is important to ensure that all independent functions and object classes function without any problems.

5.3 System Testing

Under system testing, all components would have been combined by the time the phase of testing is being conducted. This process is concerned with finding errors that result from unanticipated interactions between components and component interface problems. It is also concerned with showing that the system meets its functional and non-functional requirements, and testing the emergent system properties. Functional and non-functional requirements for the system involved testing for database connectivity and correct data retrieval, functionality performance, speed and accuracy performance.

5.4 Functional Requirement Testing

The system was tested to show its capability of connecting to the database to retrieve the necessary data specified by the user. In addition to that, the system was tested to show its response to user inputs and manipulation. All functionality tested was successful and provided the outputs expected. Figure 5.1 shows the user application displaying information retrieved from the database about events that would happen. This confirms the applications capacity to retrieve correct data from the database and display correctly. Figure 5.2 displays information retrieved from the database based on the input of the user of the application. This also confirms the applications capacity to receive input and process it accurately. Figure 5.3 displays the application's capacity to retrieve data from the database and utilize Google Map API to generate markers that indicate the location of vendors of the selected tickets.

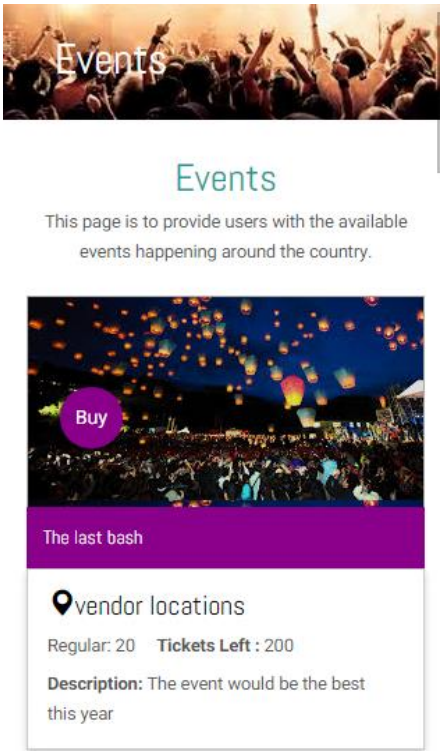

Figure 5.1: landing page

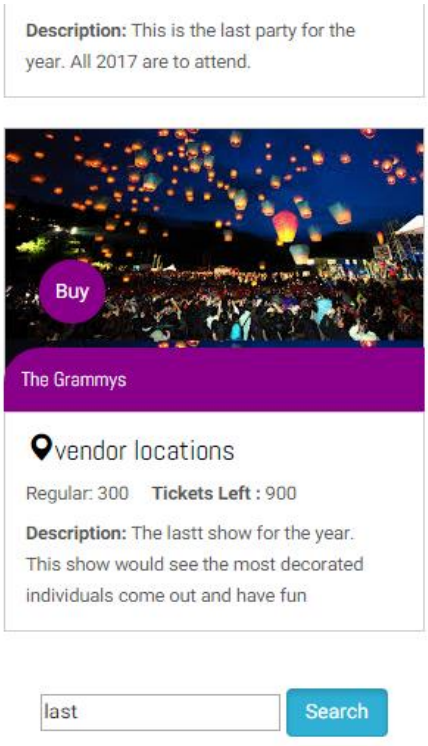

Figure 5.2: search results

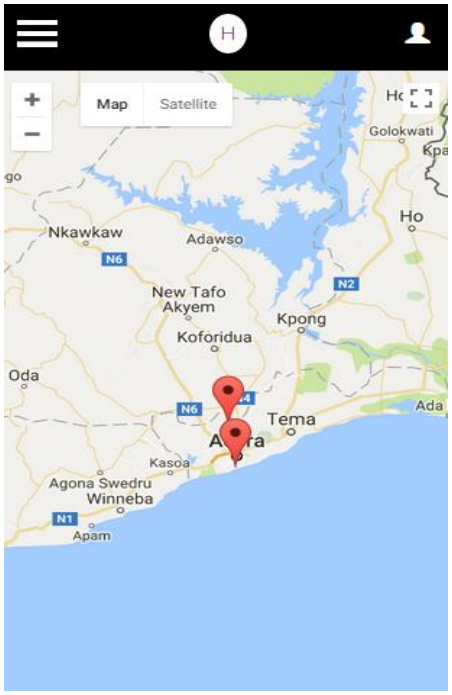

Figure 5.3: map showing markers

In addition to the above tests, the e-ticketing functionality was also tested and the results generated can be described as acceptable. The e-ticket is generated when a user makes payment for the tickets. The system combines the name of the event and the phone number of the user to generate a unique QR code. The combination is then stored in a database and retrieved when the user wants to display his or her e-ticket. The results of this test is shown in Appendix C. Appendix D also shows test results after the messaging capabilities of the application was tested. The administration application was developed as a web application thus, it was also tested to identify any bugs and inconsistencies. The initial tests were to show that the application retrieved and displayed correct data obtained from the system database. Figure 5.4 demonstrates one of such tests carried out. Another test to ensure that the administrators could be able to add new events alongside coordinates for the ticket vendors was carried out. The application after authentication would provide the interface that would allow these functionalities to happen. Figure 5.5 demonstrates yet another test that seeks to generate charts from the database the system is connected to. The information

displayed are data retrieved from the transaction table. The administrator has access to pictorial display of the number of the different tickets sold.

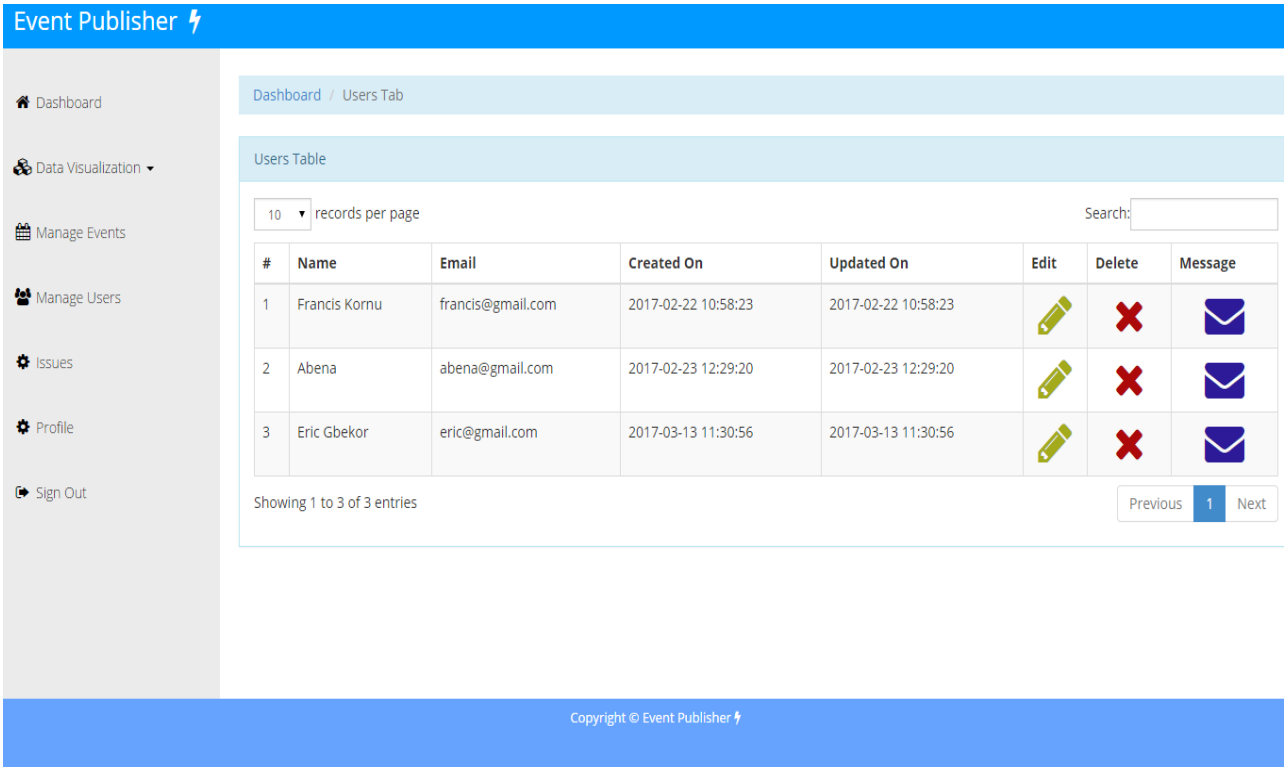

Figure 5.4: shows the application retrieving from the database

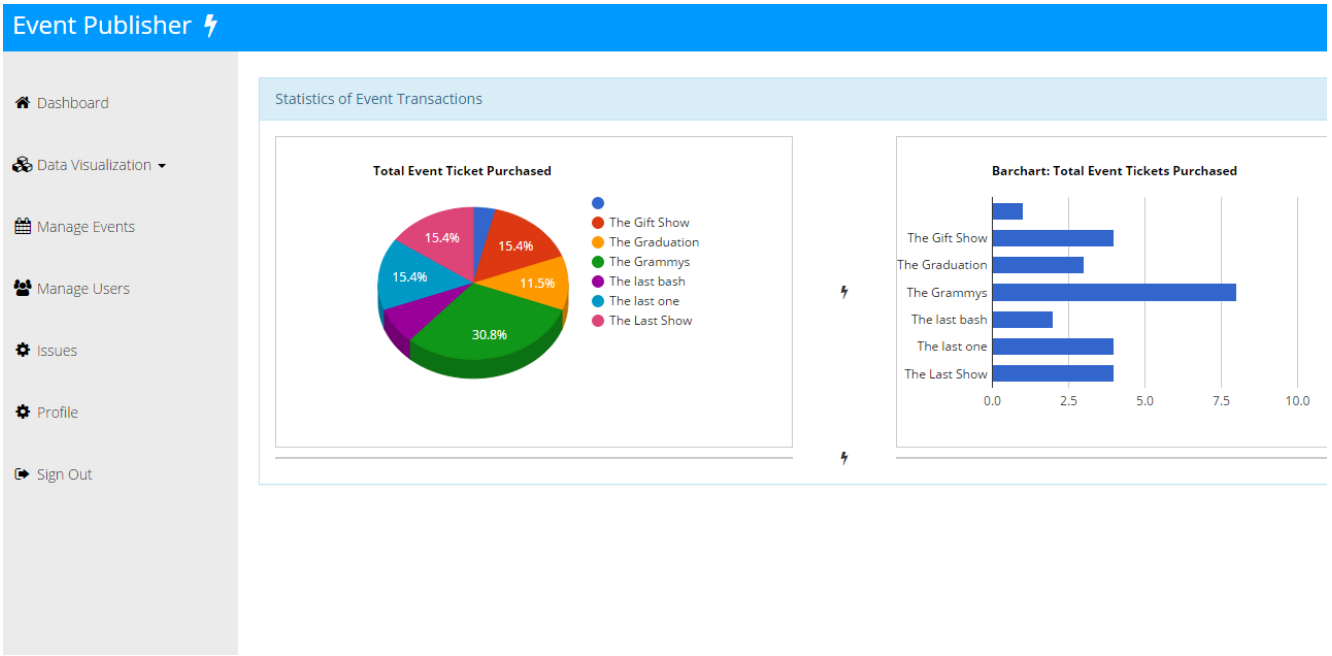

Figure 5.5: shows graphs generated from data from the database

5.5 Compatibility Testing

The administrative application is designed to function as a web application thus any prospective user could be using any browser of their choosing. This required that, the application be tested on multiple browsers to make sure it was fully functional and no errors occurred. The administration application functioned well and provided the necessary outputs.

5.6 Performance Testing

The next task is to identify how fast and reliable the applications developed are. This tested required that I use an online testing site where multiple queries would be directed at the developed application or site to see how it does. Based on the web application reacts, a grade is generated and a feedback is generated as well. The online resource used is Pingdom. There were five (5) requests made to the web application that was built for the Administrators and all five (5) requests were responded to. Feedback from the test showed that, the application was fast enough to make users have no difficulties when using it. The report generated for this test can be viewed at Appendix B.

Chapter 6: Conclusions

6.1 Challenges

There were some difficulties during the development of the user and administrative applications. The initial problem came up during the database design and development phase. As the project progressed, new tables and columns were needed to accommodate changes that were made to the applications. This translated into new designs and implementations of the database and this was a problem because data already in the system was erased. The next challenge was the installation and the use of the Laravel framework. Given that this was a new framework with different syntax and commands, code implementation and debugging was not very easy. There was the need for a lot of online resources to aid in debugging of errors.

There were also some concerns regarding the integration of mobile money onto the mobile application. The issue was that, network companies have different configurations and security keys for their mobile money VPNs. To add to that, getting the network providers to collaborate and provide these configurations and security keys was not possible given the time frame of the project.

6.2 Summary and Future Works

This paper proposes a mobile application that would use the geolocation technology introduced embedded in mobile devices alongside the option of online purchasing to aid in obtaining items of interest, mainly tickets for events in Ghana. This system is to help reduce issues pertaining queuing and protocol when buying tickets. The system is also designed to implement the google places API to help make vendor locations known to interested persons who wish to purchase an event ticket. With the whereabouts of vendors known coupled with the number of tickets available, people would be able to make informed decisions when trying to buy tickets.

In the future, the system is to be redesigned to fully utilize mobile money platform to allow users of the application make payment for their tickets. The version of the application does not allow that due to the security protocol involved when trying to setup a mobile money platform on applications.

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Appendix A

Installation of composer and laravel

Using the Installer

Download and run composer-setup.exe. This would install the latest version of Composer.

If that does not work, run the following commands in the terminal

```
php -r "copy('https://getcomposer.org/installer', 'composer-setup.php');"
php -r "if (hash_file('SHA384', 'composer-setup.php') === '669656bab3166a7aff8a7506b8cb2d1c292f042046c5a994c43155c0be6190fa0355160742ab2e1c88d40d5be660b410') { echo 'Installer verified'; } else { echo 'Installer corrupt'; unlink('composer-setup.php'); } echo PHP_EOL;"
php composer-setup.php
php -r "unlink('composer-setup.php');"
```

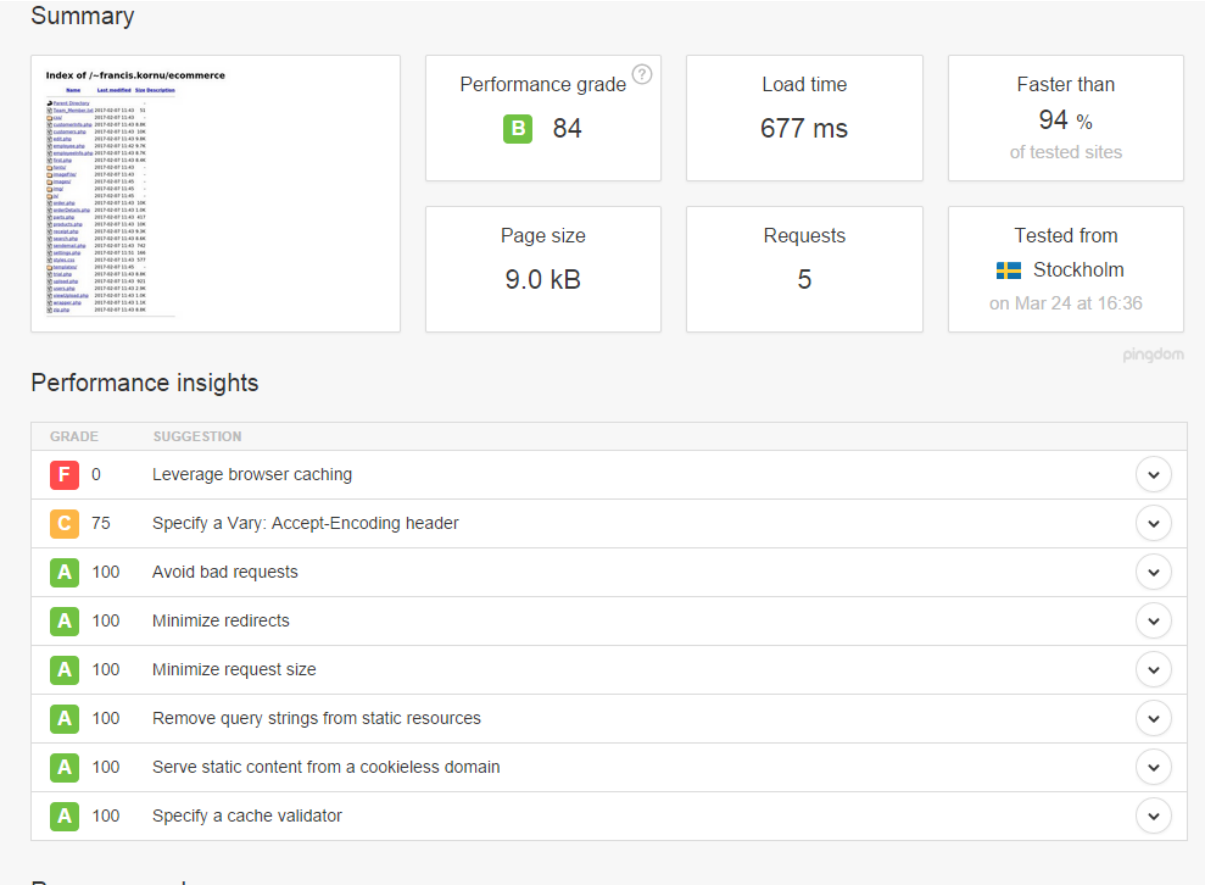
The above command would end up downloading a file named composer.phar

Run `echo @php "%~dp0composer.phar" %*>composer.bat`

After this you would have to include the directory in your path if it has not been added already. Then test to see if it works. A snippet to show the response when composer is tested on local machine.

Appendix B

A snippet of the feedback report after testing the administration application



Summary

Index of /~francis.kornu/ecommerce

Performance grade B 84

Load time 677 ms

Faster than 94 % of tested sites

Page size 9.0 kB

Requests 5

Tested from Stockholm on Mar 24 at 16:36

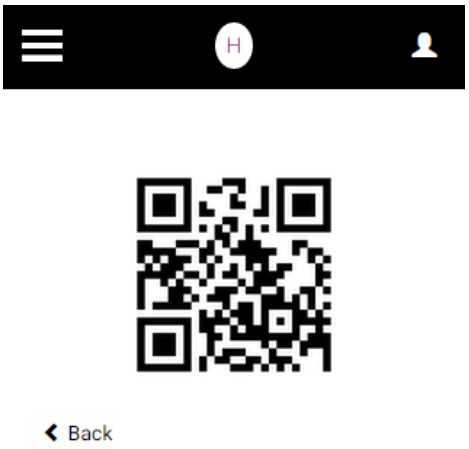
pingdom

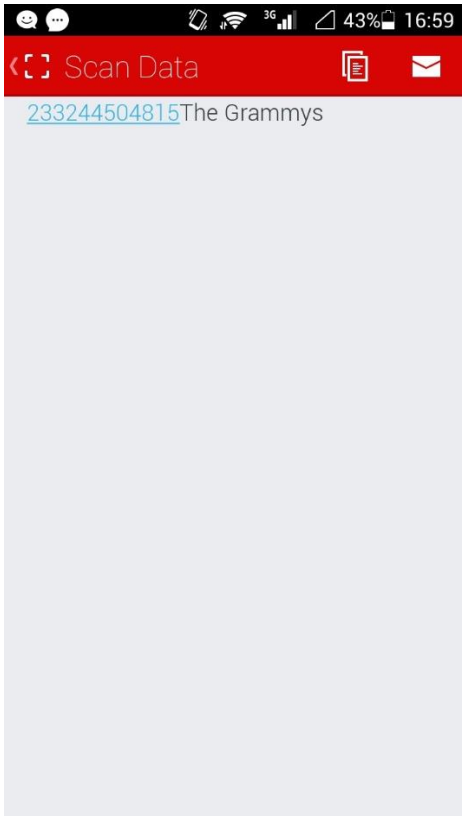
Performance insights

GRADE	SUGGESTION
F 0	Leverage browser caching
C 75	Specify a Vary: Accept-Encoding header
A 100	Avoid bad requests
A 100	Minimize redirects
A 100	Minimize request size
A 100	Remove query strings from static resources
A 100	Serve static content from a cookieless domain
A 100	Specify a cache validator

Appendix C

This section is display of the use of the QR code as an e-ticket. The image on the right shows the results after the QR code scanned.





Appendix D

This appendix is to show how the systems displays the messaging features of the user application.